

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (currently amended): A magnetic head comprising:
a read-head portion that includes one or more read insulation layers;
a write-head portion that includes one or more write insulation layers; and
~~one or more insulation layers that are optional and, if present, are disposed between the read-head portion and the write-head portion;~~

wherein at least one insulation layer selected from one of the read insulation layers [,] or one of the write insulation layers [,] ~~or one of the optional insulation layers~~ includes a material having a negative thermal expansion characteristic; and

wherein the negative thermal expansion material is selected from the group consisting of carbon fiber, carbon fiber in an epoxy matrix, carbon fiber in a photoresist matrix, zirconium tungsten in an epoxy matrix, zirconium tungsten in a photoresist matrix, hafnium tungsten in an epoxy matrix, and hafnium tungsten in a photoresist matrix.

1 2. (cancelled)

1 3. (original): The magnetic head of claim 1, wherein the insulation layer that includes the
2 negative thermal expansion material is selected from one or more of an undercoat insulation
3 layer disposed between the read-head portion and a substrate, a first insulation layer within the
4 read-head portion, a second insulation layer within the read-head portion, a write gap layer
5 within the write-head portion, a coil insulation layer within the write-head portion, or an overcoat
6 insulation layer.

1 4. (original): The magnetic head of claim 1, wherein the write-head portion further includes
2 at least two layers of induction coil turns and at least one coil insulation layer disposed between
3 the induction coil layers.

1 5. (original): The magnetic head of claim 1, further including a heat transfer layer.

1 6. (currently amended): A magnetic head comprising:

2 means for writing information to a magnetic medium, the writing means including write-
3 head electromagnetic components;

4 means for reading information from the magnetic medium, the reading means including
5 read-head electromagnetic components; and

6 means for insulating the electromagnetic components, where at least a portion of the
7 insulating means is also means for reducing the thermal expansion of the magnetic head; and

8 wherein the means for reducing the thermal expansion of the magnetic head includes a
9 negative thermal expansion material that is selected from the group consisting of carbon fiber,
10 carbon fiber in an epoxy matrix, carbon fiber in a photoresist matrix, zirconium tungsten in an
11 epoxy matrix, zirconium tungsten in a photoresist matrix, hafnium tungsten in an epoxy matrix,
12 and hafnium tungsten in a photoresist matrix.

1 7. (original): The magnetic head of claim 6, wherein the writing means further includes at
2 least two layers of means for inducing a magnetic field, where the two layers are separated by
3 means for insulating the inducing means that is also means for reducing the thermal expansion of
4 the magnetic head.

1 8. (original): The magnetic head of claim 6, further comprising:

2 an air bearing surface that includes a surface of the writing means and a surface of the reading
3 means; and means for transferring heat away from the air bearing surface.

1 9. (currently amended): A disk drive for reading and writing information in a magnetic
2 medium, the disk drive comprising:

3 a disk having a surface that includes the magnetic medium;

4 a motor coupled to rotate the disk;

5 a slider having an air bearing surface;

6 an actuator configured to hold the air bearing surface of the slider proximate to the
7 surface of the disk;

8 a magnetic head disposed within the slider and forming part of the air bearing surface,
9 wherein the magnetic head includes:

10 i) a read-head portion that includes one or more read insulation layers;

11 ii) a write-head portion that includes one or more write insulation layers; and

12 ~~iii) one or more insulation layers that are optional and, if present, are disposed~~
13 ~~between the read-head portion and the write-head portion;~~

14 wherein at least one insulation layer selected from one of the read insulation layers [[,]]
15 or one of the write insulation layers[[,]] ~~or one of the optional insulation layers~~ includes a
16 material having a negative thermal expansion characteristic; and

17 wherein the negative thermal expansion material is selected from the group consisting of
18 carbon fiber, carbon fiber in an epoxy matrix, carbon fiber in a photoresist matrix, zirconium
19 tungsten in an epoxy matrix, zirconium tungsten in a photoresist matrix, hafnium tungsten in an
20 epoxy matrix, and hafnium tungsten in a photoresist matrix.

1 10. (cancelled)

1 11. (original): The disk drive of claim 9, wherein the insulation layer that includes the
2 negative thermal expansion material is selected from one or more of an undercoat insulation
3 layer disposed between the read-head portion and a substrate, a first insulation layer within the
4 read-head portion, a second insulation layer within the read-head portion, a write gap layer

5 within the write-head portion, a coil insulation layer within the write-head portion, or an overcoat
6 insulation layer.

1 12. (original): The disk drive of claim 9, wherein the write-head portion further includes at
2 least two layers of induction coil turns and at least one coil insulation layer disposed between the
3 induction coil layers.

1 13. (original): The disk drive of claim 9, wherein the magnetic head further includes a heat
2 transfer layer.

1 14. (original): The disk drive of claim 13, wherein the slider is further configured to
2 dissipate heat and is thermally coupled to the heat transfer layer.

1 15. (currently amended): A disk drive for reading and writing information within a magnetic
2 medium, the disk drive comprising:

3 means for holding the information in a magnetic form;

4 means for rotating the holding means;

5 a slider having an air bearing surface; and

6 means for positioning the air bearing surface of the slider proximate to the holding
7 means;

8 wherein the slider further includes a magnetic head including:

9 i) means for writing the information into the holding means, the writing means

10 including write electromagnetic components;

11 ii) means for reading the information from the holding means, the reading means

12 including read electromagnetic components; and

13 ii) means for insulating the read electromagnetic components and the write
14 electromagnetic components, wherein at least a portion of the insulating means is also
15 means for reducing the thermal protrusion of the magnetic head into the air bearing surface; and
16 wherein the means for reducing the thermal protrusion of the magnetic head includes a
17 negative thermal expansion material that is selected from the group consisting of carbon fiber,
18 carbon fiber in an epoxy matrix, carbon fiber in a photoresist matrix, zirconium tungsten in an
19 epoxy matrix, zirconium tungsten in a photoresist matrix, hafnium tungsten in an epoxy matrix,
20 and hafnium tungsten in a photoresist matrix.

1 16. (original): The disk drive of claim 15, wherein the writing means further includes at least
2 two layers of means for inducing a magnetic field, where the two layers are separated by means
3 for insulating the inducing means that is also means for reducing the thermal protrusion.

1 17. (original): The disk drive of claim 15, further comprising means for transferring heat
2 away from the air bearing surface.